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How many people globally "depend" on NTFPs (or "use" them or "trade" them)?

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ABSTRACT

The objective of this paper was to investigate whether the existing estimates on NTFPs users and/or traders are accurate and calculated using reliable method, if so, to calculate new estimates based on the latest information. The results showed that the existing numbers in the literature are "guesstimates" and are not based on robust calculation method(s). The study concluded that there are 'no reliable global 'figures on NTFP users and/or traders. Therefore, the researchers have to stop citing such figures in their future works. Further research is needed to address an important gap in the literature on reliable number of NTFPs users and/or traders.

1. Introduction

The past decade has witnessed a rapid growth of interest in non-timber forest products (NTFPs) among conservation and development organizations (Neumann and Hirsch 2000; Marshall et al. 2003). There are a number of reasons for the general spread and upsurge in global interest in NTFPs. It is believed that the promotion of sustainable use of NTFPs could lead to a win-win situation for poverty alleviation and biodiversity conservation (Shiva and Verma, 2002; Golam et al. 2008). This is due to the increasing recognition that NTFPs can contribute significantly to the livelihoods of forest dependent communities (Belcher et al., 2005; Marshall et al., 2005; Ros-Tonen and Wiersum, 2005; FAO, 2006; Ahenkan and Boon, 2010); household food security and nutrition (Clark and Sunderland, 2004; Shackleton and Shackleton, 2004; Ahenkan and Boon, 2008); generate additional employment and income (Andel, 2000; Marshall et al., 2003); and offer opportunities for NTFP based enterprises (Shackleton and Shackleton, 2004; Subedi, 2006). Moreover, NTFPs are more accessible to the poor (Saxena, 2003); contribute to foreign exchange earnings (Andel, 2000; Shiva and Verma, 2002); and support biodiversity and other conservation objectives (Shackleton and Shackleton, 2004; Marshall et al., 2005). Furthermore, NTFPs can be harvested with relatively little impact on the forest environment (Neumann and Hirsch, 2000; FAO, 2008). The significance of NTFPs effectively captured the imagination of conservationists around the world when an article by Peter et al. (1989) published in '*Nature*' claiming that more money could be earned from tropical forests by collecting these products than from logging (Arnold and Ruiz Pérez, 2001). Since then, the importance of NTFPs has moved to the centre stage of the global development agenda. The Food and Agriculture Organisation (FAO) of the United Nations was one of the first agencies to promote NTFPs through their programme on "Non-wood Forest Products". Then later and over the past 20 years, other international agencies such as the World Bank, Canadian International Development Agency (CIDA), International Development Research Centre (IDRC), Centre for International Forestry Research (CIFOR), International Union for the Conservation of Nature (IUCN) and the Biodiversity Support Programme (BSP), among others, have incorporated the concept of NTFPs into their research and development programmes.

Internationally, trade in NTFPs is estimated at USD 11 billion annually (Shiva and Verma, 2002; Marshall et al., 2005; Ahenkan and Boon, 2010) and constitutes an important source of livelihood for many people worldwide (Angelsen et al., 2003; Chidumago and Gumbo, 2010). Consequently, globaly different numbers of NTFPs-dependent people have been cited in the literature. In addition to that the authors using different verbs while describing interaction of people with NTFPs even for the authors reporting the similar figures (e.g. Scherr et al., 2004; Basu et al., 2013). This contradiction leads to doubts on such figures as well as on the methodology used for their estimation. Moreover, most figures are more than a decade old, but papers are still citing the same numbers as though nothing has changed since the original numbers were estimated. Thus, updated information on NTFP users and/or traders is important and timely for designing effective policies and projects for forest-based sustainable livelihoods and conservation. Therefore, the objective of this paper was to investigate whether

the existing estimates on NTFPs users and/or traders are accurate and calculated using reliable method, if so, to calculate new estimates based on the latest information.

2. Methodology

An initial literature search was carried out using Google Scholar and ISI Web of Knowledge to catch publications with the existing estimates. Search terms were divided into four parts: a "NTFP" term, a "dependency" term, a "use" term, and a "trade" term. These terms were combined with those found in "livelihoods" literature as well as more general terms such as "rural development" and "forestry" in order to pick up non-specialist literature that might include existing estimates. The author investigated the documents available only in English-language, primary field studies undertaken on NTFPs dependency, use and trade. Figures in peer-reviewed studies as well as grey literature from the well-established organizations (e.g. FAO, World Bank, Forest People Programme) were investigated. All estimates were traced back to the original source(s) and assessed in order to examine the figures as well as the robustness of method used for calculating them.

3. Results and Discussion

Existing estimates on NTFPs dependents (users and/or traders)

The results of the literature search showed that there are different figures in the literature on NTFPs users and/or traders (Table 1). According to FAO (2001) the global number of people who use NTFPs ranges from 1.4 billion to 1.6 billion while the World Bank (2002) reported that the number ranged from 1 billion to 1.2 billion. The investigation found that the original sources (e.g. FAO; World Bank) of global and regional estimates on NTFPs dependent people currently in circulation are not using robust calculation method. According to the results, the estimates origin is usually a back-of- the- envelope calculation based on number of poor people living in rural areas and an assumption of their degree of reliance on NTFPs. For example, a regional figure of 15 million developed by Byron and Arnold (1997) based on the assumption that in Africa, about 4% of the rural population obtains some of their income from NTFPs**.** A similar approach is reflected in the assumption used in FAO (1995): "In 1990, FAO estimated that about 2 billion people (or 3/4 of the population in developing countries at that time) depended on biomass for their energy consumption". Although the estimates are based on the assumptions and do not follow statistical method yet papers are still repeating the same numbers even nothing has changed since the original numbers are guesstimated. Globally, there have been large changes over the last two decades including urbanization, forest cover, poverty reduction, education levels, countries' GPD, and increases in NTFPs trade. Moreover, people reliance on NTFPs is varying over time for livelihoods- not just for subsistence but also for income generation - according to their socio-economic characteristics (Shackleton et al., 2008; Paumgarten and Shackleton, 2009; Adam et al., 2013, Angelsen et al., 2014; Sunderland et al., 2014), forest resource tenure (Deininger, 2003; Sunderlin et al., 2005; DFID, 2007; Jagger et al., 2014), market remoteness (Angelsen et al., 2014; Becher et al., 2015), forest resource proximity (Becher et al., 2015), and experienced shocks (Angelsen et al., 2014).

The searching results also showed that there are similar figures cited in recent publications. For instance, Scherr et al. (2004) and Basu et al. (2013) each have a figure for 350 million people, but the verb used to describe peoples' interaction with NTFPs is very different (table 1).

Table 1- Statements used by authors and the estimated figures on NTFP dependents

Statement(s) used by author(s)	*Estimated figure*	*Author(s)*
"People depend on NTFPs as their main source of income, food, nutrition and medicine"	350 million	(Basu et al., 2013)
"People who live in or near forests and use NTFPs for supplementary income and safety-nets"	350 million	(Scherr et al., 2004)
"People who are artisans or employees in formal or informal forest-based enterprises"	45 million	(Scherr et al., 2004)
"people who use NTFPs"	1.4-1.6 billion	(FAO, 2001)
"about 2 million people (or 3/4 of the population in developing countries) depended on biomass for their energy consumption"		(FAO, 1985)
"In Africa, it appears that roughly 15 million people, obtain some of their income from NTFPs"	15 million	(Byron and Arnold, 1997)
"People who their livelihoods depend on hunting, gathering, and shifting cultivation"	200 million	(TauliCorpuz, 2011)
"People who all or part of their livelihood depend on NTFPs"	1-1.2 billion	(World Bank, 2002)

This may be due to the fact that NTFP literature has built up the variations on what is included in combination with inconsistent use of the term "dependency" which has lifted an enormous scope for ambiguity or complete lack of definition. The problem of measuring degrees of reliance initially appears to be a tricky one. However, it remains a complex task to find out the level of NTFPs contribution to people's livelihoods. Questions of the 'a little', 'a lot' kind, or attempts to establish reliance on the NTFP for 25%, 50% etc. of a person's livelihood, would be very vague, while measuring potential substitution by other products would be even more so. But, participatory research techniques are also appropriate for exploring the more complex questions such as temporary reliance (e.g. in shock period or an emergency), choice and change over time. Changes over time might also be recorded by regular surveys designed to monitor trends in relation to particular products or activities. However, this would be a costly alternative. The author believe that the lack of global or even regional NTFP dependents number owes partially to lack of motivation and partially to difficulties of measurement and its high related costs.

Suggestions for NTFP dependents estimation

The paper didn't fulfil the second objective of this paper as there were no robust statistical techniques used to calculate the current figures in the literature. But, we elaborated on some suggestions that can help in data collection for estimating NTFP users and/or traders in the future as follows:

Definition of categories of NTFP dependents

A first step towards estimating the NTFP users and/or traders is to construct clear definition of categories of NTFP dependents and their level of reliance. This is particularly worrying as governments and development agencies undertake projects and policy changes on rural livelihoods improvement and conservation, possibly based on false understanding of the actual number of NTFPusers and/or traders. Moreover, the NTFP reliance could be defined by people who use and/or trade different categories of NTFPs- wild foods, plants medicine,fodder, fuel, etc.- and partly also by religious/cultural values. A definition based mainly on use and/or trade of NTFPs is helpful because it should allow the researchers to develop a set of basic indicators to measure the NTFP reliance and then user and/or trader numbers. Although any effort will inevitably generate debate about which definition is the most suitable one, a working definition of user categories for the purposes of information collection could be based on the studies by Byron and Arnold (1997, 1999). This approach suggests the following categories:

1. People living in the forest such as hunters, gatherers, and long-rotational shifting cultivators, who obtain most of their livelihoods form forest products;
2. Populations of small farmers relaying for part of their livelihoods on adjacent forest or woodland;
3. Traders and processors of forest products and employees in forest industries (e.g. artisans and the landless rural poor); and
4. Urban and per-urban consumers of forest products (e.g. NTFPs).

User categories (1-3) might be considered "core NTFP users and traders". User category (4) might or might not be included in the definition of NTFP people. But this approach is useful because it will allow the researcher(s) to disaggregate the total NTFP dependents into user categories. Therefore, each information end-user can be built up from the "building blocks" of information collected. This will also allow using the system of information collected by a variety of different stakeholders.

Byron and Arnold approach suggests that- whether or not the researchers are interested in quantative information- they can pursue the following strategies.

i. Define users;
ii. Define users relationship to forest or forest products (e.g. NTFPs);
iii. Define the importance of this relationship for users/traders livelihoods; and
iv. Assess the impact of change, including availability of alternatives.

However, a number of key problems will arise when the researcher(s) following Byron and Arnold approach, and these including:

i. What NTFPs should be included?
ii. Can researchers distinguish between people reliance on NTFPs and their reliance on other forest products (e.g. not considering as NTFPs)?
iii. How do researchers measure the degree of reliance on NTFPs, particularly for user categories (2)- where reliance on a NTFP is partial and often temporary- and (3 & 4)- where an element of choice may exist?
iv. How do researchers assess change over time leading to greater or lesser NTFP users and/or traders number?

v. How do researchers deal with the question of 'negative reliance' (e.g. the relationship with NTFP use and/or trade is short-term and destructive)?

Sampling

To be able to sample the target population, it is necessary to have a sampling frame that covers the population of interest-who was given or was not given a chance to be selected- since this influences the ability to generalize results (Fowler 2014). Finding an appropriate sampling frame is the first challenge will come across and we believe that a possible solution lies in the use of maps of NTFP-produced forests cover. Even though the estimation of numbers of people who use and/or trade NTFPs is essentially a population study, we suggest that area-based sampling methodology may be suitable. In part this is relevant if the sizes and distribution of people who use and/or trade NTFPs are different in rural or urban areas than in densely-populated areas. It also has some advantages in cases where up-to-date, reliable population listings are relatively harder to find or less complete for remote or inaccessible areas. One area-based approach, the use of transect samples, already familiar to foresters, might be an option. A transect, may be starting within the forest edge and extending "outwards" some way beyond it would be a one plausible, practical and reproducible way of enumerating people (those living in the transect) and measuring the extent of their NTFP use and/or trade. This information could then be combined with forest maps and area population statistics to scale up the findings and to put the results into perspective. The purpose of sampling in this way is to get what can be justified as a reasonably representative "cross-section" of the population: it is not intended to suggest that all or any forms of NTFP use and/or trade should be expected to differ in a systematic, quantitative way with distance from a forest margin. There is evidence that some forms of NTFPs use and/or trade do not relate to distance from clearly-identifiable forests. Moreover, the needs is to combine results of estimation from a number sample locations, and this means the methodology used must be reasonably well standardized at all locations, at least for that part of study which yields a local contribution to the overall estimate of Numbers.

With an area-based sampling frame, strata could be created if there were evidence that particular livelihood strategies (e.g. subsistence, safety-nets, accumulative), or socio-economic segments, were to be found concentrated in geographically distinct areas (e.g. the use and/or trade of wild foods, medicinal plants, etc…) might differ in nature or quantity among people. The user categories may be difficult to use for stratification purposes when the individuals fall into each group are dispersing and intermingling in the same areas. This would make it difficult to identify them in advance in order to form strata. One main benefit of stratifying is that, where there are distinct concentrations of population members of a given type, appropriate stratification allows the design of efficient sampling schemes which maximize the information that is collected for the NTFP resources available. The second main benefit is that as ample specifically chosen to contain proper representation of such strata also facilitates reporting separately and clearly on meaningful subsets, wherean overall summary might lump together very dissimilar segments of users and/or traders.

Planning data collection

The planning process for a data collection involves systematic consideration of how the survey will be set up. There are a number of choices to be made, including number of sites, selection of sites, sampling procedures within sites, sampling size, mode of management, stakeholder involvement, mode of data collection and others. This applies to both 'quantitative' and 'qualitative' approaches to data collection. The first ‘reality check’ is to agree on what constitutes a most favourable setting and to check whether the time and effort involved are worthwhile from the point of view of the cost of information collection.

4. Conclusion

The article discusses an important issue that deserves the attention of the governments, and development and conservation organizations working all over the world- especially in developing countries-, and which have major activities in the areas of forest-based livelihoods improvement, forests conservation and forests sustainable management. The main lesson regarding the NTFP users and/traders figures in the literature, is that these figures are not based on robust statistical method(s). Therefore, the researchers have to stop citing them in their future works. It is also important to appreciate any attempts or ongoing works for estimating the NTFP users and/or traders in the future.

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